EXAMINER'S AMENDMENT

1.   An examiner's amendment to the record appears below. Should the changes and/or

additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR

1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the

payment of the issue fee.

2.   Authorization for this examiner's amendment was given in a telephone interview with

Mr. Jeffrey S. King (Reg. No. 58,791) on May 26, 2009.

3.   The application has been amended as follows:

Regarding Fig. 2, Examiner suggests that Applicant fill the currently empty boxes 26

and 32 with corresponding text to make it clear that boxes 26 represent routing protocols and

boxes 32 represent virtual interfaces; Examiner further suggest that Applicant write "user space"

in the large box containing VR1 and VR2.

Listing of Claims:

1. (currently amended) A routing device comprising:

an operating system kernel;

a plurality of physical interfaces configured to receive packets to be forwarded;

a plurality of virtual routers, wherein the plurality of virtual routers comprise a

plurality of instructions for controlling a data processor to perform one or more tasks, the

instructions being stored on a computer readable medium, and wherein the plurality of virtual routers are external to the operating system kernel, wherein each virtual router further comprises:

a routing protocol stack configured to handle a plurality of routing protocols;

a plurality of interface drivers configured to communicate with at least a one of the plurality of physical interfaces;

an Internet Protocol (IP) stack configured to interact with the routing protocol stack and perform a forwarding function via the plurality of interface drivers, the IP stack having a forwarding information table, information from which is used to perform the forwarding function, wherein the routing protocol stack and the IP protocol stack are implemented using dynamic libraries shared among the plurality of virtual routers; and

a socket layer having a corresponding socket application programming interface, the socket layer configured to facilitate interactions between the IP stack and the routing protocol stack and the application, wherein the socket application programming interface is used to facilitate communications with the socket layer;

a router manager configured to manage the plurality of virtual routers, wherein the router manager is configured to couple each virtual router to at least one of the physical interfaces, wherein the router manager controls the coupling of the virtual routers to the physical interfaces, and wherein the coupling is performed on a dynamic basis; and

an application, wherein the application is situated external to the plurality of virtual routers, and wherein the application being configured to receive requests to perform a plurality of tasks for at least one client application;

wherein the application is able to selectively communicate with one or more of the plurality of virtual routers and the operating system kernel on a dynamic basis to perform the plurality of tasks for the at least one client application, wherein the application selects a virtual router to perform a task based upon a set of routing protocols supported by the virtual router and the task to be performed;

wherein the IP stack of each of the plurality of virtual routers resides external to the operating system kernel;

wherein the operating system kernel further includes an associated socket layer, the socket layer having a corresponding socket application programming interface; and

wherein the application is able to communicate with the operating system kernel via the associated socket layer using the corresponding socket application programming interface to have the operating system kernel perform one or more of the plurality of tasks.

2. (previously presented) The routing device of claim 1 wherein software is used to implement the router manager.

3-5. (canceled).

6. (original) An UNIX system incorporating the routing device as recited in claim 1.

7. (canceled).

8. (currently amended) The routing device of claim [[7]] 1 wherein software is used to implement the plurality of virtual routers and the router manager.

9-12. (canceled).

13. (currently amended) A routing device comprising:

an operating system kernel;

a plurality of physical interfaces configured to receive packets to be forwarded;

a plurality of virtual routers, each virtual router having an associated socket layer and an Internet Protocol (IP) stack external to the operating system kernel, the associated socket layer having a corresponding socket application programming interface configured to facilitate communications with the associated socket layer, wherein each virtual router includes a routing protocol stack configured to communicate with corresponding physical interfaces, [[and]] wherein the routing protocol stack and the IP protocol stack are implemented using dynamic libraries shared among the plurality of virtual routers, wherein the virtual routers further include:

a plurality of interface drivers configured to communicate with corresponding physical interfaces, wherein the Internet Protocol (IP) stack is configured to

interact with the routing protocol stack and perform a forwarding function via the plurality of interface drivers, the IP stack having a forwarding information table, information from which is used to perform the forwarding function; and

a socket layer having a corresponding socket application programming interface, the socket layer configured to facilitate interactions between the IP stack and the routing protocol stack and the application, wherein the socket application programming interface is used to facilitate communications with the socket layer; [[and]]

an application residing external to the plurality of virtual routers; and

a router manager configured to manage the plurality of virtual routers, wherein the router manager is configured to couple each virtual router to at least one of the physical interfaces, wherein the router manager controls the coupling of the virtual routers to the physical interfaces, and wherein the coupling is performed on a dynamic basis;

wherein the associated socket layer is configured to facilitate interactions between the IP stack and the application;

wherein the application is able to selectively interact with one of the plurality of virtual routers via the associated socket layer;

wherein the application is configured to receive requests to perform a plurality of tasks for at least one client application;

wherein the application uses the corresponding socket application programming interface to interact with the associated socket layer; and

wherein the application is able to selectively interact with one or more of the plurality of virtual routers and the operating system kernel on a dynamic basis in order to have one or more of the plurality of virtual routers and the operating system kernel perform a plurality of tasks for the at least one client application, wherein the application selects a virtual router to perform a task based upon a set of routing protocols supported by the virtual router and the task to be performed;

wherein the operating system kernel further includes an associated socket layer, the socket layer having a corresponding socket application programming interface; and

wherein the application is able to communicate with the operating system kernel

via the associated socket layer using the corresponding socket application programming interface

to have the operating system kernel perform one or more of the plurality of tasks.

14-15. (canceled).

16. (original) An UNIX system incorporating the routing device as recited in

claim 13.

Reasons for Allowance

4.   The following is an examiner's statement of reasons for allowance:

None of the prior art of record (IP Infusion "Virtual Routing for Provider Edge

Applications" and Huang et al. "The ENTRAPID Protocol Development Environment"), taken

singularly or in combination, reasonably taught or suggested the combined limitations of claims

1 or 13.

IP Infusion disclosed:

a plurality of physical interfaces (IP Infusion, Figs, 2 and 4-5)

a plurality of virtual routers each comprising a routing protocol stack, a plurality of

interface drivers, an Internet Protocol (IP) stack, a socket layer (IP Infusion, Fig. 2, page 2, col. 2

and page 4, col. 1)

a router manager (IP Infusion, Fig. 4, "Global Management Authority (GMA)").

IP Infusion did not explicitly disclose:

wherein the IP stack resides external to the operating system kernel;

wherein the router manager controls the coupling of the virtual routers to the physical

interfaces, and wherein the coupling is performed on a dynamic basis;

an application, wherein the application is situated external to the plurality of virtual

routers, and wherein the application is able to selectively communicate with one or more of the

plurality of virtual routers and the operating system kernel on a dynamic basis, and wherein the

application selects a virtual router to perform a task based upon a set of routing protocols

supported by the virtual router and the task to be performed.

Huang et al. disclosed

A plurality of physical interfaces (Huang, Fig. 1);

A plurality of virtual routers each comprises a routing protocol stack, a plurality of

interface drivers, an Internet Protocol (IP) stack, a socket layer, wherein the IP stack resides

external to the operating system kernel (Huang, Fig. 1 and page 3, col. 2);

an application, wherein the application is situated external to the plurality of virtual

routers, and wherein the application is able to selectively communicate with one or more of the

plurality of virtual routers and the operating system kernel on a dynamic basis"

Huang did not explicitly disclose:

a router manager wherein the router manager controls the coupling of the virtual routers

to the physical interfaces, and wherein the coupling is performed on a dynamic basis; and

that the application selects a virtual router to perform a task based upon a set of routing

protocols supported by the virtual router and the task to be performed.

Therefore, **IP Infusion** and **Huang et al.**, taken singularly or in combination, did not

reasonably teach or suggest the specific limitations of

"a router manager wherein the router manager controls the coupling of the virtual routers

to the physical interfaces, and wherein the coupling is performed on a dynamic basis; and

an application, wherein the application is able to selectively communicate with one or

more of the plurality of virtual routers to perform a task and the operating system kernel on a

dynamic basis based upon a set of routing protocols supported by the virtual router and the task

to be performed" in combination with the test of the limitations.

5.   The claimed invention is fully supported by the specification as originally filed (Fig. 2,

"physical interfaces 36"; Fig. 2 and paragraphs [0007-0009] and [0021], "a router device",

"VR1", VR2", "routing protocol stack 26", "socket layer 28" and "IP stack 30"; paragraph

[0019], "router manager"; Fig. 2 and [0026-0029], "applications 24).

6.   Any comments considered necessary by applicant must be submitted no later than the

payment of the issue fee and, to avoid processing delays, should preferably accompany the issue

fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for

Allowance."

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to SHIRLEY X. ZHANG whose telephone number is (571)270-

5012. The examiner can normally be reached on Monday through Friday 8 am - 5:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, William Vaughn can be reached on (571) 272-3922. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

like assistance from a USPTO Customer Service Representative or access to the automated

information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Shirley X Zhang/

Examiner, Art Unit 2444

5/29/2009

 /William C. Vaughn, Jr./

Supervisory Patent Examiner, Art Unit 2444